

NOTES ON WINTERING MERLINS IN WESTERN MONTANA

CHRISTOPHER SERVHEEN

ABSTRACT - Wintering Merlins (*Falco columbarius*) were studied in Missoula, Montana, from 1977 through 1979 where all 3 North American subspecies winter together. The main food of the Merlins is the Bohemian Waxwing (*Bombycilla garrulus*), which congregates in large flocks throughout the winter to feed on fruits of ornamental trees in residential areas of the city. Possible origins of the 3 subspecies and hunting techniques are discussed.

The Merlin has been considered an uncommon breeding species throughout its range (L. Oliphant, this issue) in North America. Many aspects of Merlin biology are unknown including winter habits. This paper reports on Merlins wintering in an urban area in western Montana.

STUDY AREA AND METHODS

Wintering Merlins were studied within Missoula, a city of 36,000 population located in a mountain valley in west-central Montana. The Missoula valley has an elevation of 950 m and is approximately 32 km long by 16 km wide and is surrounded by precipitous forested mountains up to 2,900 m in elevation. Missoula is west of the Continental Divide in the upper Columbia River drainage. Large ornamental trees are established throughout much of the residential area of the city. Prior to settlement, the valley was probably devoid of large trees except those along the Clark Fork River which bisects the city. The winter climate varies, but much of the winter is cold with temperatures of -15°C not uncommon. Precipitation averages 33 cm per year and snow often covers the ground throughout the winter. Winds are generally light to moderate.

Observations were made from October through March, 1977 through 1979. Merlins were observed perching, feeding, and chasing prey. Individual Merlins were trapped, measured, photographed, and banded with USFWS bands. Prey remains were collected under perching trees and identified to species. In 1979 a single Merlin was fitted with a tail-mounted radio transmitter and tracked for 10 d.

RESULTS AND DISCUSSION

Subspecies present. — Seven Merlins were captured within the city of Missoula during the study. Of these, 4 were measured and banded with USFWS bands. The remaining 3 were captured by falconers and were photographed but not measured. These 7 Merlins were characterized to subspecies using the criteria from Temple (1972) (Table 1).

The identification of *F. columbarius suckleyi* was based on the extremely dark plumage with no visible tail bands on the dorsal surface and 3 very faint tail bands on the ventral surface. The identification of *F. c. columbarius* females was more difficult. Tail barring was not useful as the percentage of birds with 4 tail bars is not significantly different between western taiga *F. c. columbarius* and coastal forest *F. c. suckleyi* (Temple 1972). Tail length and wing chord measurements were not useful in differentiating *F. c. columbarius* from *F. c. suckleyi* because of probably feather length differences with age and overlap in 95% confidence intervals for feather length between coastal forest and taiga populations (Temple 1972). The most useful criterion was the presence or absence of anterior and posterior web barring of

Table 1. Characteristics of Merlins captured in Missoula, Montana, during the winters of 1976-77 and 1977-78.

SUBSPECIES	SEX	AGE ^a	WT(G)	BAND #	# TAIL BANDS (MM)	WING CHORD (MM)	TAIL LENGTH
<i>F. c. columbarius</i>	M	A	154	1143-57207	4	190	116
<i>F. c. columbarius</i>	F	A	223	1143-57208	4	210	128
<i>F. c. columbarius</i>	F	S	275 ^b	1143-57209	4	213	135
<i>F. c. richardsonii</i>	F	A	235	793-03903	5	225	137
<i>F. c. richardsonii</i>	M	S	160	----	4	203	122
<i>F. c. suckleyi</i>	F	A	---	----	3	---	---
<i>F. c. columbarius</i>	F	S	---	----	4	---	---

^a A = Adult; S = Subadult (estimated based upon plumage and feather wear)

^b Weight with a full crop; bird was captured with a full crop

the primaries. All 4 individuals thought to be *F. c. columbarius* had no barring on the anterior web and complete barring on the posterior web. The individual *F. c. suckleyi* had no anterior barring and incomplete posterior barring.

Tail length measurements agreed with ranges measured by Temple (1972) (Table 1). The *F. c. richardsonii* female was in adult plumage with several worn feathers indicating it had gone through at least 1 molt. Tail length of this bird was within 1 standard deviation of mean adult female tail length measured by Temple (1972) for *F. c. richardsonii*. The *F. c. columbarius* female with tail length of 135 mm (#1143-57209) was thought to be less than a year old judged by uniform feather wear. The tail length was at the high range of western taiga specimens measured by Temple (1972) as would be expected in a subadult with longer feathers.

Origin of the Wintering Population. — The occurrence of all 3 subspecies in Missoula during winter is unusual because of the separate and distinct breeding range of each (Temple 1972). Western Montana is one of the few areas in North America where the breeding ranges of all 3 subspecies are relatively close together. This juxtaposition of breeding ranges is probably responsible for the origin of all 3 subspecies wintering in Missoula.

Breeding of *F. c. richardsonii*, the prairie race, has been documented in areas of southern Alberta (Hodson 1976) and Montana (Becker, this issue) east of the Continental Divide. No published breeding records of this subspecies are available from west of the Continental Divide (those breeding in southwest Wyoming are morphologically nearest to *richardsonii*, Ed.), although Craig and Renn (1977) described two instances of Merlins (subspecies not defined) nesting in southern Idaho in cool desert upland habitat more typical of *F. c. richardsonii* habitat than that of *F. c. columbarius* or *suckleyi*. The limited data on *F. c. richardsonii* west of the Continental Divide suggest that *F. c. richardsonii* individuals wintering in Missoula may have crossed the Continental Divide (150 km to the east of Missoula) during fall and spring migration.

F. c. columbarius has not been positively documented as a breeding subspecies in Montana, although scattered Merlin nesting records from west of the Continental Divide cited by Ellis (1976) and Weydemeyer (1973), and documented by other qualified observers (E. Foss, pers. comm.) are probably *F. c. columbarius* based on Temple's (1972)

maps and the nesting habitats selected. Due to the difficulty of finding Merlin nests (Ellis 1976; L. Oliphant, pers. commun.) it is likely that *F. c. columbarius* may nest in western Montana in greater numbers than previously thought, although it is still rare. The boreal forests of western Canada may support significant numbers of breeding *F. c. columbarius*, and the Rocky Mountain trench provides an excellent migratory pathway to funnel migrating individuals from northern forests into the Flathead Valley immediately north of Missoula. Thus, *F. c. columbarius* individuals wintering in Missoula could come from local and/or more northerly breeding populations.

The origin of *F. c. suckleyi* in Missoula is unusual in light of its current coastal breeding distribution from southeast Alaska to southwest British Columbia. Missoula lies approximately 830 km inland from the Pacific northwest coast. The rich coastal fauna and relatively stable winter weather conditions result in a reduced seasonal migration for resident coastal raptors such as the Peregrine Falcon (*Falco peregrinus pealei*) (Beebe 1960, 1974) and Bald Eagle (*Haliaeetus leucocephalus*) (Servheen and English 1979). Such reduced migrational movements would also be expected for *F. c. suckleyi* which can prey on large flocks of shorebirds which winter in Pacific coastal areas (Page and Whitacre 1975; C. Anderson, pers. comm.). The long distance inland movement to winter in severe weather conditions exhibited by *F. c. suckleyi* in Missoula remains unexplained.

Food Habits. — Food habits of wintering Merlins in Missoula are closely associated with large flocks of Bohemian Waxwings (*Bombycilla garrulus*) which winter in Missoula and feed on abundant fruits of mountain ash (*Sorbus spp.*) and crabapple trees (*Malus spp.*) which are grown as ornamentals in the city. This association has also been reported by Smith (1978). Prey remains under Merlin perching trees consisted of Bohemian Waxwings.

Hunting flights on waxwings usually were initiated from high perch trees where the Merlin had a view of waxwing flocks flying above the open tree canopy of residential areas. Merlins were observed attempting to fragment a waxwing flock by direct flight, and then pursuing an individual separated from the main group. The pursued waxwing usually tried to escape by flying to cover, but the Merlin usually attempted to stay below the waxwing and thus force it up and away from cover. I have ob-

served 2 instances of straight pursuit where the Merlin was able to out-fly the waxwing. Both times the waxwing exhibited rapid evasion turns only when the Merlin was upon it, but I was unable to see the end of either flight.

Another flight observed involved a single waxwing diving for a group of 4 small conifers with the Merlin approximately 6 m behind. The Merlin entered the conifers after the waxwing, much like a Sharpshinned Hawk (*Accipiter striatus*), and the 2 moved through 2 other conifers until the waxwing left the trees. The waxwing then began to fly upward in a spiral with the Merlin flying below in large circles to gain altitude. The waxwing escaped as the Merlin did not climb fast enough to attempt capture. The Merlin eventually gave up pursuit and flew to a perch in a nearby tree.

Waxwings occur in flocks of up to 2,000 to 3,000 and respond to Merlin attacks by bunching into tight ball-like formations. They will form dense evasion clouds when a Merlin appears and smaller flocks will attempt to join the large group.

Roosting. — In the winter of 1978-79, a tail-mounted radio transmitter was placed on a Merlin. That winter was the coldest on record, and waxwings were very scarce. The Merlin was tracked for 10 d. It roosted at night inside dense ornamental spruce (*Picea* spp.) trees within 10 to 50 m of houses and busy streets. Weather severity with temperatures down to -30°C was probably a factor in selection of dense spruce. On one morning with extremely cold temperatures, the Merlin did not leave the night roost tree until between 1030 and 1130 H. When the Merlin was in these trees it apparently was perched close to the trunk in the interior and it was impossible to see from the outside of the tree.

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School of Forestry, University of Montana, Missoula, Montana 59812. Present address: U.S. Fish and Wildlife Service, HS 105D, University of Montana, Missoula, Montana 59812.